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REVIEWS AND NOTES.

LIFE-TABLES.

The Construction of Life Tables, and on their Application to a Comparison of the Mortality from Phthisis in England and Wales during the Decennia 1881–90 *and* 1891–1900. By T. E. Hayward, M.B., F.R.C.S., Medical Officer of Health for Haydock, England. pp. 42, with tables and diagrams.

The subject-matter of this monograph consists of a lecture which was honored by being accorded a place in the series of "Advanced Lectures on Public Health" inaugurated by the Victoria University of Manchester, England. In his prefatory note the author says, "However distasteful descriptions and explanations of statistical methods may be, it must at least be conceded that without statistics the science of public health would scarcely have been founded, and that without them it would be scarcely possible to measure its progress." The subject of the lecture is one which necessarily lends itself, as the author states, to a class of *readers* more or less advanced in their knowledge of the construction of life-tables rather than *to hearers*.

In the *first* part a description and explanation are presented of some technical points relating to the construction of life-tables.

The *second* part contains a demonstration of the application of life-tables,—among other methods, to comparing the mortality from some special cause, such as phthisis, in two successive decennia.

An ideal life-table might be formed by starting an account of a certain number of infants, say ten thousand or a hundred thousand, all born on the 1st of January in a given year, and making up a yearly account of the deaths throughout a century, or until all are dead. This, however, is impossible, and the method in common use assumes that rates of mortality at different ages, which exist *simultaneously* during a limited period of observation, will come successively to affect a supposed generation of individuals from birth to the end of life.

In this portion of the lecture the author deals with the following topics: Construction of Extended Life-tables, the Graphic Method, the Method of Finite Differences; Calculation of Mean Population

Numbers from Census Figures; Calculations for the First Five Years of Life; Practical Working Formulæ and Abbreviated Methods of Life-table Construction. The difficult subject of interpolation is fully treated, and methods are given for correcting the serious errors which are invariably found in all census returns as well as in death registers, due to misstatements as to the ages of the living and the dead.

Of the cruder methods usually termed the Graphic Method, believed to have been employed by Milne in constructing the Old Carlisle Table and by Dr. Newsholme in his Brighton Life-tables, Dr. Hayward makes the following statement:—

"If the *probability* curves taken from the life-tables which have been constructed in this way be tested by the methods previously indicated, there are none of them, except Dr. Newsholme's second Life-table for Brighton and Dr. Barclay's Life-table for New Zealand, 1891–95, which give at all satisfactory results; and these latter have been made satisfactory by departures, to some extent, from the original method."

The second portion of the lecture deals with the mortality from phthisis and its effect upon life-tables, and here the author presents a table showing the mortality of each sex, at different ages of life, from phthisis, in the two periods 1881–90 and 1891–1900 in England, from which it appears: (1) that the comparison of the figures for the two decennia shows a very marked decrease in the mortality from phthisis at all age periods except for ages eighty-five and upward, such decrease affecting females much more than males; (2) that, notwithstanding the decrease, phthisis is still exacting a very large death-toll. The following extract shows that Dr. Hayward does not agree with the prophecies which have been recently made by Hillier and by Behring as to the probable extinction of phthisis within a half century.

"The total extinction of phthisis may be regarded at present as an almost Utopian dream, or scarcely within measurable distance of realization; and, while it may be of interest to employ exact statistical methods to measure the total effects of phthisis on longevity, it may be of still more interest and advantage to apply these methods in measuring the effects of such an actually observed concrete instance of diminished mortality as is set forth in the tables."

In these tables it is shown that there was a marked decrease in the phthisis mortality in England during the two successive decennial periods ending with 1900, amounting to 14.75 per cent. among males and 25.86 per cent. among females.

The exact conclusions of the author from these researches may be summed up as follows:—

I. If there had been no mortality from phthisis in England and Wales during 1891–1900:—

Males would have had:—

(1) Expectation of life at birth increased by 2.22 years.

(2) Average existence during working period of life lengthened by 1.67 years.

(3) Average life-capital increased by 1.93 years.

Females would have had:—

(1) Expectation of life at birth increased by 1.93 years.

(2) Average existence during working period of life lengthened by 1.46 years.

(3) Average life-capital lengthened by 1.46 years (both sexes 1.71 years).

II. As the result of the decrease in the mortality from phthisis during 1891–1900 as compared with 1881–1890:—

Males have had:—

(1) Expectation of life at birth increased by 0.45 year.

(2) Working period of life prolonged by 0.35 year.

(3) Average increase in life-capital of 0.35 year.

Females have had:—

(1) Expectation of life at birth increased by 0.68 year.

(2) Working period of life prolonged by 0.53 year.

(3) Average increase in life-capital of 0.48 year.

Several carefully drawn diagrams illustrate the author's observations, the figures for males being selected for presentation.

S. W. Abbott.

AUSTRIAN CENSUS OF OCCUPATIONS.

The preliminary results of the Austrian Census of Occupations, taken on Dec. 31, 1900, have just been published in *Statistische Monatsschrift*, vol. viii. p. 647. The inquiry with respect to occupations was made on the population schedule of the general census. Every person, without regard to age, has been included in the enumeration. The figures show that, out of a population of 26,150,708, 14,107,452, or 54 per cent., are engaged in gainful occupations, exclusive of domestic service. The number and percentage of persons engaged in each class of occupations is shown in the following summary:—